

Appendix A: Caribbean Puerto Rico and U.S. Virgin Islands

Introduction and Overview

The Caribbean area includes several diverse ecosystems, ranging from tropical wet forest to sub-tropical dry forest, and including karst forest, forested herbaceous wetlands, gorgeous rivers and streams, cave systems, mangrove swamps and coral reefs. Habitat modification and destruction are the most significant threats to the fish and wildlife resources in the Caribbean. Urban and industrial development near important areas of flora and fauna (e.g., National Wildlife Refuges or Commonwealth Forests) threatens the biodiversity of the Caribbean.

By the 1920's more than 90 percent of the island was deforested. Following this extensive deforestation, shade coffee plantations (Puerto Rico and Hawaii are the only areas within the U.S. where coffee is cultivated) represented the remaining available habitat, serving as refuges and corridors for many wildlife species.

The coffee region of Puerto Rico covers an area of approximately 900,000 acres. Modern agricultural practices have converted many of the shade coffee plantations to sun coffee plantations. This conversion practice destroys habitat for many wildlife species and migratory birds through greater soil erosion, pollution (e.g., heavy use of chemical fertilizer and pesticides), and reduced biodiversity.

The Caribbean Area is one of the world's centers of biodiversity and endemism (Helmer 2002). The northern karst region of Puerto Rico exhibits a high endemism with approximately 54 percent of the species known only from this Country.

The Caribbean Islands exhibit a diverse topography, soils, and variations in temperature that results in considerable biological diversity over small areas and small distances. Based on the Helmer's (2002) study, the Island of Puerto Rico has approximately 10 types of forest and land cover.



*Puerto Rico and
U.S. Virgin Island locations*



*The coffee region covers
approximately 900,000 acres*

Over 78 animal and plant species are listed as federally endangered or threatened (3 amphibians, 11 reptiles, 10 birds, 5 mammals and 49 plants) within the Caribbean. In addition, six species are candidates for listing without federal protection. The Commonwealth's Department of Natural and Environmental Resources (DNER 2006) lists 133 species of concern (3 amphibians, 13 reptiles, 17 birds, 7 mammals, all species of seahorse, one species of mullet and 48 plants).

One geographic focus area was selected for the Caribbean to direct most of the Partners Program assistance and funding for habitat improvement projects over the next five years. This focus area shelters a high biodiversity including karst forests, wet tropical forests, underground river systems, cave systems, and mangrove marshes.

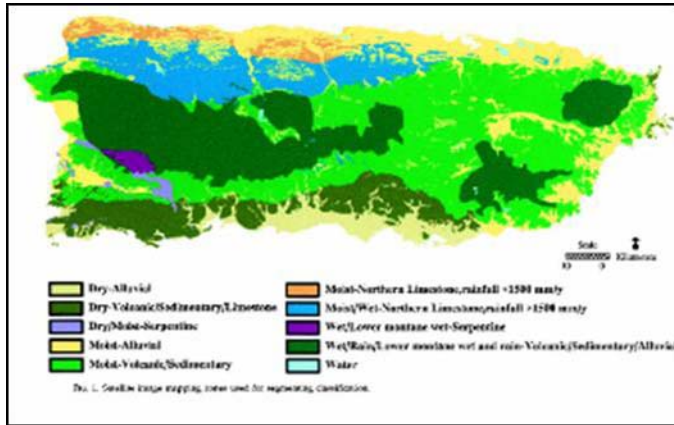


North Central Basin Focus Area

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The Partners Program selected the north central area basin of Puerto Rico as the geographical focus area within the Caribbean. This area is located between the northern karst region (limestone) and the Cordillera Central (volcanic). This focus area was chosen based on federally listed species, critical wildlife areas identified by the DNER (2006), ongoing habitat improvement and stakeholder interest, and the degree of development pressure (USDA 2001). This area provides habitat to approximately 39 federally listed species, including habitat for neotropical migratory birds (over 100 species reported), waterfowl species, and the river systems that provide habitat to anadromous species. Helmer (2002) identified five types of forest for this area, dominated by the Moist/Wet-northern limestone forest type. Over 16 rivers are present within the focus area; eight of them are the main rivers in the karst region. Most of the drainage within the karst belt is subterranean through interconnected passageways or caves flowing out to the north coast.

The northern karst region is recognized for its water resources, including several subterranean rivers and streams, aquifers, springs, waterfalls, artificial lakes or reservoirs, lagoons, natural ponds and wetlands. The subterranean rivers within the karst region work as underground routes for water movement. This phenomenon is not present in the volcanic region.



Type of Forest and land cover map (Helmer 2006)



Sub-Tropical Wet Forest view



Northern Karst Belt view

A proposed central mountain ecological corridor is located within the focus area and covers 37,000 acres of private lands. In addition, fourteen Commonwealth owned protected areas are found, including the Rio Abajo Commonwealth Forest, identified as the release site (fall of 2006) for the endangered Puerto Rican parrot. The private lands adjacent to the Rio Abajo Commonwealth Forest are identified by the DNER (Forestry division) and the Service as a priority area of habitat restoration and enhancement for the benefit of the Puerto Rican parrot.

The Puerto Rican Parrot is the only native parrot within the United States. This species is one of the 10 most endangered bird species in the world. Puerto Rican parrot endangerment is caused by human influence (habitat modification and

degradation) and natural events (hurricanes). At the present, only one population is known; located in El Yunque National Forest administrated by the U.S. Forest Service.

The Puerto Rico Critical Wildlife Areas (DNER 2006) and the Puerto Rico Wildlife Action Plan (PRDNER 2006) identified the areas of Hacienda la Esperanza, (administrated by the Puerto Rico Conservation Trust), Caño Tiburones and Cibuco Swamp (administrated by the PRDNER) as an important waterfowl areas. The Cotto and Coco's Wards areas were included as an important habitat for the threatened Puerto Rican crested toad (private lands). In addition, the Guajataca cliff (private land) was identified as an important nesting area for migratory sea birds. In addition, the Puerto Rico Conservation Trust received a grant from the Service for land acquisition in the northern karst for habitat conservation and important area for migratory birds.

Priority Habitat

Upland: Karst Area Forest

Five-Year Target (FY 2007-2011)
400 acres

Focus Species*

Thirty-five federally listed species (e.g., Puerto Rican Boa, E; Puerto Rican Sharp-shinned Hawk, E; and Puerto Rican Parrot, E)

Threats

The karst region is vulnerable to human interference, such as poor agricultural practices, residential and commercial development, and road construction.

Actions Strategies

Work with private landowners and other partners to identify degraded sites and carry out habitat improvement projects. Contact and encourage landowners to participate in the Partners Program or other conservation programs available in the Caribbean.

Priority Habitat

Riparian

Five-Year Target (FY 2007-2011)
Four miles

Focus Species*

Neotropical migratory birds; numerous federally listed species (e.g., Puerto Rican boa, E)

Threats

Human interference such as deforestation for agricultural practices, development

Actions Strategies

Work with all partners to implement habitat projects in riparian buffers, including revegetation with native trees, fencing livestock out of the streams, and providing alternative watering sources.

Priority Habitat

Wetland

Five-Year Target (FY 2007-2011)
10 acres

Focus Species*

Migratory waterfowl species of concern (SOC) (e.g., Ruddy duck, White cheeked pintail, West Indian whistling duck), native birds SOC (e.g., Little blue heron, Common moorhen, and least bittern)

Threats

Human activities resulting in soil erosion and sedimentation, and agricultural activities, such as the use of fertilizers and pesticides



USFWS



USFWS

Puerto Rican Crested Toad Project (over 11 partners involved). First tadpole release at Hacienda el Tallonal (private land) located in the northern karst region.

Actions Strategies

Work with private landowners and other partners to identify and carry out habitat improvement projects in wetlands. Assist landowners in understanding all available conservation programs.

*E=federal listed endangered species; SOC=species of concern

Stakeholders Involved

The following is a list of stakeholders involved in the Partners Program in the Caribbean Area. Stakeholders are involved in carrying out program mission, vision, activities, project development and implementation in coordination with the Partners biologist. Their support has been providing technical assistant, identifying potential partners, producing native species, and general program actions.

- Private landowners (approximately 79)
- Commonwealth Department of Natural and Environmental Resources
- USDA; Natural Resources Conservation Service
- USDA; Farm Service Agency
- USDA; U. S. Forest Service
- Department of Agriculture
- Puerto Rico Conservation Trust
- EnviroSurvey Inc.
- Citizen of the Karst
- Ecokinetics Inc.
- Iniciativa Herpetologica Inc.

- University of Puerto Rico at Mayaguez
- Metropolitan University
- Natural History Society
- The Nature Conservancy

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